(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 396 179 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90201035.4**

(51) Int. Cl.5: **A47B 17/00, A47B 13/06**

(22) Date of filing: **25.04.90**

(30) Priority: **05.05.89 IT 2039589**

(43) Date of publication of application:
07.11.90 Bulletin 90/45

(84) Designated Contracting States:
BE CH DE ES FR GB IT LI LU NL

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(54) Support structure for tables and similar office furniture with transverse insertion of service cables.

(57) Support structure for tables and similar office furniture, comprising a load-bearing beam, connecting together at least two support elements, above which there is supported and constrained a working plane, in which the support elements are constituted of a lower element and an upper element, capable of being connected together with engagement and constraint, embracing the load-bearing beam, the elements being equipped, the one with rod-shaped legs for resting on the ground and the other with rod-shaped arms for supporting the plane, which legs depart from a lower connecting block and are integral with it and the arms depart and are integral with an upper connecting block, the lower and upper elements being clamped to one another, with rigid constraint of the load-bearing beam, by means of a single tension member, apertures being provided in the support elements and in the working plane and leading out laterally, adapted for receiving at least one cable or the like, by insertion in a direction transverse to its length.

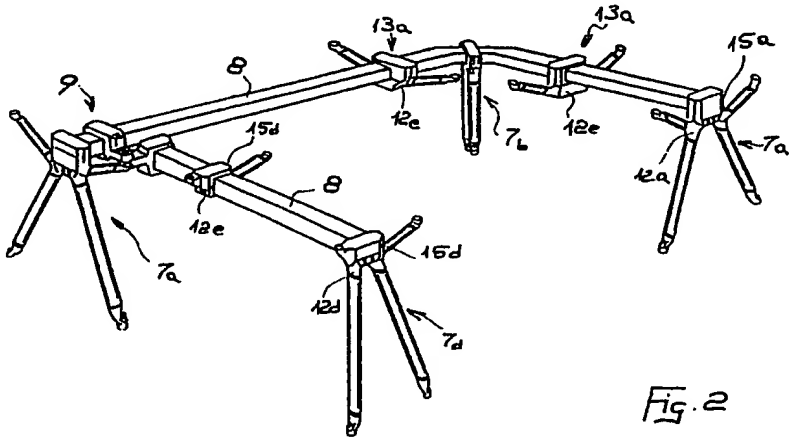

Fig. 2

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The subject of the present invention is a support structure for tables and similar office furniture. For the equipping of offices and similar work locations, furniture such as tables, desks and the like are used, which permit support for writing or reading, and carry typewriters and calculating machines, and telephones and the like.

Such furniture items, hereinafter generally termed as a class "tables", can be generally separated and independent or may be connected to one another, for example in order to form single or multiple work stations, and are usually equipped with calculating machines, typewriters, data processors, lamps, telephones and so on; for such machines, the associated electrical signal and supply cables are necessary.

The housing of said cables is effected by means of beams disposed beneath the working plane, in order to avoid the presence of many separate cables randomly dispersed on the floor in order to connect up the associated machines; said beams, in addition to housing the aforementioned cables and conducting them into close proximity with the user equipment, provide stiffness to the entire structure.

An example of a structure for office tables of the type indicated above is given by the Utility Patent No. 206,883, of the same Proprietor as the present Application.

This Utility Patent provides support elements for the planes of substantially I-shape, composed of several metal elements secured together to form a base, a slender central stem and a double bracket carrying the plane; between the stem and the upper double bracket the load-bearing beam is clamped.

This structure appears fairly pleasant from the aesthetic aspect and possesses a load-bearing beam adapted for effectively housing the cables; it nevertheless is tedious to assemble, since it must comprise several elements to form each support element and this is undesirable, because the operations of assembly and dismantling are often carried out several times after the initial installation, for example for changes in the internal layout of offices.

The presence of a single, slender central stem, moreover, secured by fixity at its ends, reduces the stiffness of such a structure, especially in the case where it must be able to support, on the working plane, heavy machines, packages and documents, or other structures of considerable height.

The requirement therefore arises for creating a support structure which shall be capable of dismantling by simple rapid operations, and which shall be composed of few components and shall have high stiffness, making it suitable for firmly supporting even heavy weights.

A further requirement arises from the fact that, in the conventional structures, the electrical and signal cables to be inserted into the respective housings must be free at one end, that is to say disconnected from the associated equipment or plugs and the like: in fact the passages usually provided require the insertion of the cables longitudinally through holes and the like, which are too small to permit the passage of the plugs, especially if several cables are conducted through the same hole.

It is therefore desirable to be able to insert the cables into the associated passages and to lead them from these passages inside the load-bearing beam, then leading them out of the latter to bring them above the working plane near to the user apparatus, in a transverse direction, without it being necessary to have access to one end.

Said results are achieved by the present invention, which provides a support structure for tables and similar office furniture, comprising a load-bearing beam, connecting together at least two support elements, above which a working plane is supported and constrained, in which the support elements are constituted of a lower element and an upper element, capable of being connected together with engagement and constraint, while embracing the load-bearing beam, the elements being equipped, the one with rod-shaped legs for resting on the ground and the other with rod-shaped arms for supporting the plane, which legs depart from a lower connecting block and are integral with it, and the arms depart and are integral with an upper connecting block, the lower and upper elements being tightened against each other with rigid clamping of the load-bearing beam, by means of a single tension member, openings leading out laterally being provided in the support elements and in the working planes, these openings being adapted for receiving at least one cable or the like, by insertion in a direction transverse to its length.

The load-bearing beam is clamped between the lower and upper elements with the interposition of inserts of plastics material of limited compressibility, having reference teeth capable of engaging into corresponding holes of the load-bearing beam and the legs depart in substantially diverging manner from the relative connecting block in the plane perpendicular to the load-bearing beam and the arms depart in substantially diverging manner from the relative connecting block in the plane perpendicular to the load-bearing beam.

The lower and upper connecting blocks are tightened together by means of a through bolt, with its head rotationally blocked inside the lower block.

The lower connecting block is equipped with a lower opening, closed by a cover secured with restraint, which is provided with at least one vertical

slit open to the outside, adapted for permitting the insertion and for receiving one or more cables, inserted into it in a direction transverse to their longitudinal dimension.

The working plane is equipped, in position corresponding to the connecting block of the upper element, with a substantially rectangular cut-out, open towards the outside, having along its sides several opposed, projecting pins having their facing ends terminating at a short distance apart, adapted for enabling at least one cable to be inserted and housed, the cable being inserted into the cut-out in a direction transverse to its length.

Further details can be established from the following description with reference to the attached drawings, in which there are shown:

in Figure 1, an overall perspective view of a group of office tables according to this invention, connected together;

in Figure 2, the support structure of the tables of Figure 1;

in Figure 3, a single table according to this invention, in perspective view;

in Figure 4, the load-bearing side frame of a table of Figure 1, with its legs open and symmetrical;

in Figure 5, a load-bearing side frame with legs in asymmetrical form;

in Figure 6, a load-bearing side frame with legs brought together;

in Figure 7, a load-bearing side frame with asymmetrical plane;

in Figure 8, the table of Figure 3 in lateral view;

in Figure 9, a detail, partly in section, of the side frame of Figure 4:

in Figure 10, the section on the plane X-X of Figure 9;

in Figure 11, a detail of Figure 9, seen from above;

in Figure 12, a detail of the passage element for the cables through the upper plane;

in Figure 13, the element of Figure 12, viewed from above.

As shown in Figure 1, a group of tables, desks and the like for office purposes may comprise a table 1, a service table 2, a typing table 3, a corner plane 4, and other similar elements, variously disposed according to the requirements; such tables, as will be defined as a whole below, are composed of a support structure 5, which may be common to a certain number of them, as illustrated, and of working planes 6 carried by this structure and having various shapes and heights according to requirements.

The structure 5, which can be seen in Figure 2 with the various working planes 6 removed, is composed of different support elements or side-frames 7, connected together by load-bearing beams 8, equipped with associated angled connecting elements and the like 9, to constitute a unified complex.

In an elementary form, a single table according to this invention, illustrated in Figure 3 in perspective view and in Figure 8 in front view, comprises a pair of side-frames 7 connected by a beam 8 and having a plane 6 above it.

The load-bearing beams 8 and the associated connecting elements may with advantage be of known type, as described in Utility Patent No. 206 883 of the same Proprietor, to which reference is made for the relative descriptions.

In the above-mentioned Utility Patent there was described a support element of substantially I-shape, having a widened base, a central stem and an upper, widened-out portion, on which the relative working planes rest; said structure, however, was of limited stiffness and had to be assembled on the site from several metal and plastics elements, with consequently long assembly times.

The support elements according to this invention have a configuration which provides, in the symmetrical shape 7a shown in Figure 4, a lower element 10a, comprising two inclined legs 11 connected together at the top by a lower connecting block 12a, and an upper element 13a, having two inclined arms 14, connected together by an upper connecting block 15a.

Between the lower block 12 and upper block 15 there is clamped the load-bearing beam 8, which assures the stiffness of the structure; on the upper element 13 there rests the plane 6, which is secured to the ends of the arms 14.

In Figures 5, 6 and 7 there are illustrated alternative forms of embodiment, 7b, 7c, 7d, some of which are shown in the complex of Figure 2.

In particular in Figure 5 a support element is illustrated, which comprises an asymmetrical lower element 10b, having one inclined leg and one vertical leg, the legs being connected together by a lower connecting block 12b; at the top there is an upper closure body 15b, by means of which the complex is secured to the load-bearing beam 8.

Said support elements are used in the cases in which it is desired to support the beam 8, but not the overlying plane, which may be absent or supported in a different manner.

In Figure 6 there is illustrated a different form, in which the upper support element is the same as that of Figure 4, while the lower element 10c possesses vertical, parallel legs close together, connected together by the connecting block 12c.

The element of Figure 7, in turn, has a lower element 10b, the same as that described with reference to Figure 5, and an upper element 13d having a connecting block 15d carrying a single

inclined arm for supporting a working plane 6, which plane also rests upon one shaped end 16 of the block 15d.

As will be seen, each side frame or support element is composed of a lower element and of an upper element, connected together and clamping the load-bearing beam 8 between them; various lower elements can be combined according to requirements with different upper elements, in order to provide the support elements required from time to time; in Figure 2 it is also possible to see support elements having an upper element 13a, carrying the arms, and a lower closure body 12e, without any legs, which enables the load-bearing beam 8 to be clamped or gripped and a support to be provided for a plane 6, resting on the beam itself, without the encumbrance of the legs.

This is rendered possible by the shape of the lower and upper connecting blocks 12 and 15, illustrated in Figures 9, 10 and 11.

As shown, the lower connecting block 12 is a hollow metal body, having a pair of lower projecting stub pipes 17, to which are secured, by force-fit, plastic deformation, welding, soldering or the like, the tubular metal legs 11; there also extend upwards the stubs 18, adapted to be inserted into corresponding holes of the upper block 15, which in turn is composed of a hollow metal body carrying the stub pipes 19, to which the arms 14 are secured in a manner analogous to the legs 11.

The body 12 possesses an upper wall 20, equipped with transverse flanks 21; between them the head of a bolt 22 is housed, blocked against rotation, the bolt passing through the wall 20 and the load-bearing beam 8 bearing against this wall and against a wall 23 of the upper block 15, where it is secured by a nut 24.

This enables the two blocks, lower and upper, to be rigidly tightened together by means of the single bolt 22, by tightening the cross-members 25a of the block 15 into bearing against the corresponding surfaces 26a of the block 12 and by tightening together the corresponding oblique surfaces 25b and 26b.

Between the blocks 12 and 15 there is also clamped the load-bearing beam 8, for which there is provided a seating, formed inside the block 12 and the upper transverse plates 23a of the block 15.

Inserts of plastics material 23b are provided, having teeth which can engage into corresponding holes of the upper edges of the beam 8.

As a result of the deformability of the inserts 23b, the beam 8 can be secured without play, so as to assure the stiffness of the complete assembled frame.

In the case of the closure blocks 12e or 15b, these have a structure similar to that of the blocks 12 and 15 of Figure 9, the stub pipes 17 or 19 respectively being omitted from them.

In this way, the assembling of the support element 7, which must be carried out on site for setting up the table or group of tables required, can be carried out especially quickly, it being necessary only to tighten up the respective lower and upper elements around the beam 8, by means of a single screw, on which it is possible to act easily from the top only, for the purpose of tightening.

The head of the beam 8 and the opening in the upper block 15 above it may be closed, if they are located in an end position, by appropriate plugs of plastics material 26, 27, which can be inserted fixed in the respective seatings; the space underneath the wall 20, for its part, contained between the oblique walls 28, can be closed by means of a curved cover 29, the shape of which completes the surface continuity of the block 12.

As Figures 9 and 11 show, the cover 29 possesses two slits 30 on each side; through these electrical, telephone, signal and similar cables 31, as indicated diagrammatically in Figure 10 by broken lines, can be easily introduced with a movement transverse to the axes of these cables, and then inserted in the beam 8 through corresponding slits of its bottom wall, thus housing these cables in the beam and leading them to the desired region of a complex of connected tables.

This operation is, of course, possible by removing the upper element 15.

This enables cables which are already connected to the associated user equipment or which are fitted with plugs or the like, to be inserted, which would not be possible through holes and similar apertures for which insertion in an axial direction would be required.

Such cables, furthermore, can pass through the support element 7, remaining secured to it, and finally can pass through the working plane 6 to reach the apparatus which they serve, or they may lead out from the beam 8 upwards, for the same purpose, passing through the working plane.

For this purpose, the plane 6 possesses a lateral cut-out 32, shown in Figures 12 and 13, of substantially rectangular shape, having on its two opposite sides 33 a plurality of elongated, projecting pins 34 of substantially cylindrical shape, with their free ends close together and disposed in several rows throughout the entire length of the cut-out 32; said pins 34 can bend laterally to permit the insertion, in a direction transverse to the axis, of cables and the like, and to enable these to be housed and secured.

The structure according to this invention therefore allows a group of office tables or the like, connected together, to be equipped with supply and signal lines for the various items of office

equipment, without it being necessary for the relevant cables ever to be dismantled or cut off at one end to allow them to be inserted into seatings intended for them, through holes or apertures closed on all four sides.

The support elements, furthermore, as a result of their rod-shaped construction, enable high stiffness to be achieved, while at the same time leaving ample space at the base for paasage, cleaning and the like.

At the lower ends of the legs 11 there are present support feet for resting on the floor, appropriately adjustable in height in order to adapt to the undulations of the supporting surface; such support feet may be of known type and are not described here in greater detail.

Numerous variants can be introduced, without thereby departing from the scope of the invention in its general characteristics.

Claims

1. Support structure for tables and similar office furniture, comprising a load-bearing beam connecting together at least two support elements, above which elements a working plane is supported and secured, characterized by the fact that the support elements are constituted of a lower element and an upper element, capable of being connected together with engagement and constraint, embracing between them the load-bearing beam and equlpped, the one with rod-shaped legs for bearing on the ground and the other with rod-shaped arms for supporting the plane, which legs depart from a lower connecting block and are integral with it and the arms depart and are integral with an upper connecting block, the lower and upper elements being tightened against one another, with rigid clamping of the load-bearing beam, by means of a single tension member, apertures which are open at the side being provided in the support elements and in the working plane, these apertures being adapted for receiving at least one cable or the like, by insertion in a direction transversely to its length.

2. Support structure according to Claim 1, characterized by the fact that the load-bearing beam is clamped between the lower and upper elements with the interposition of inserts of plastics material of limited compressibility, having locating teeth capable of engaging into corresponding holes of the load-bearing beam.

3. Support structure according to Claim 1, characterized by the fact that the legs depart in substantially divergent manner from the associated connecting block in the plane perpendicular to the load-bearing beam.

4. Support structure according to Claim 1, characterized by the fact that the arms depart in substantially diverging manner from the associated connecting block in the plane perpendicular to the load-bearing beam.

5. Support structure according to Claim 1, characterized by the fact that the lower and upper connecting blocks are tightened together by means of a through bolt, having its head blocked against rotation inside the lower block.

6. Support structure according to Claim 1, characterized by the fact that the lower connecting block is equipped with a lower opening closed by a cover secured by fixity, which cover is equipped with at least one vertical slit open towards the outside, adapted for permitting the insertion and for receiving one or more cables, inserted into it in a direction transverse to their longitudinal dimension.

7. Support structure according to Claim 1, characterized by the fact that the working plane is equipped, in correspondence with the connecting block of the upper element, with a substantially rectangular cut-out open towards the outside, and having along its sides a plurality of opposed, projecting pins, having their facing ends terminating at a short distance apart, the pins being adapted for permitting the insertion and housing of at least one cable, inserted into the cut-out in a direction transverse to its longitudinal dimension.

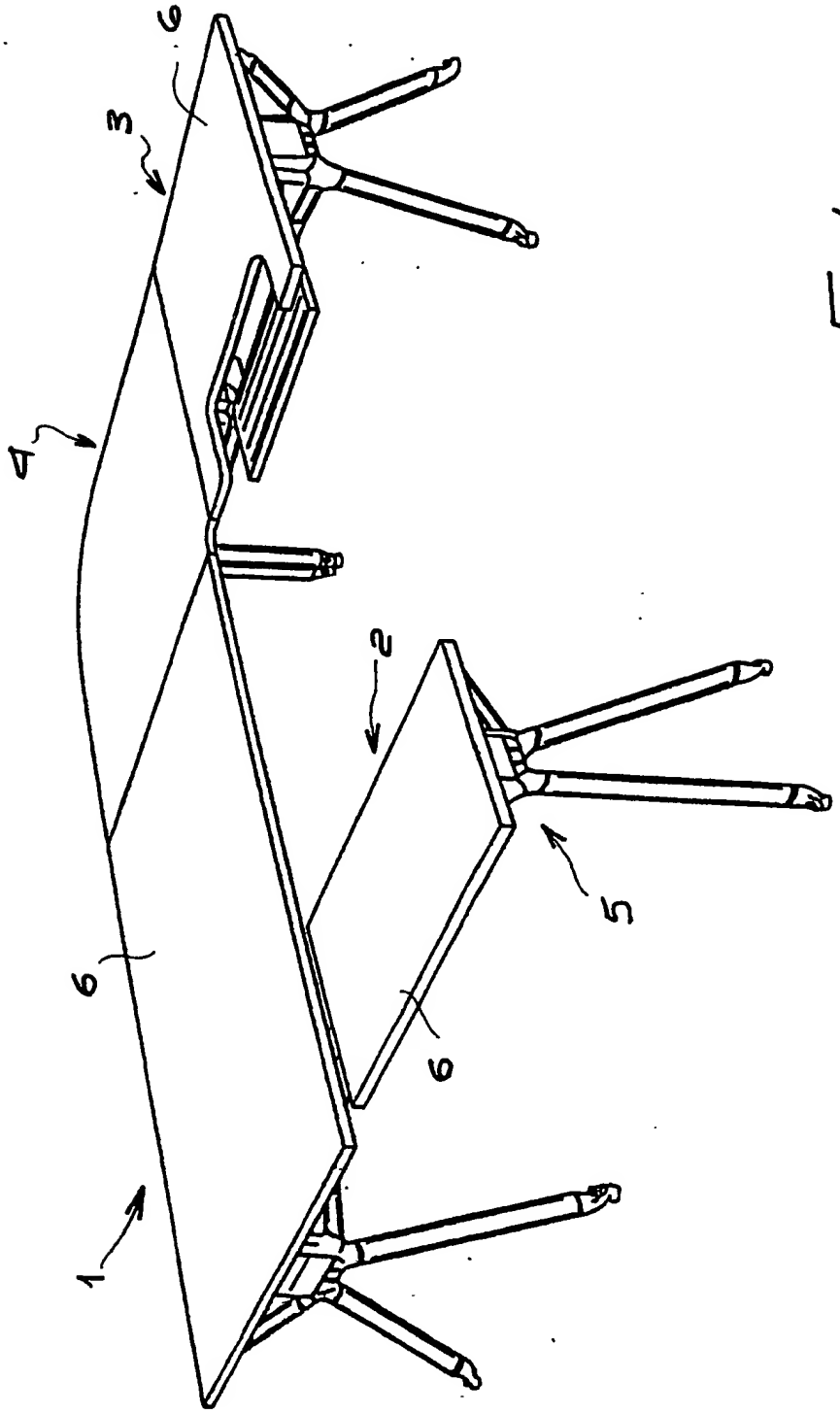

Fig. 1

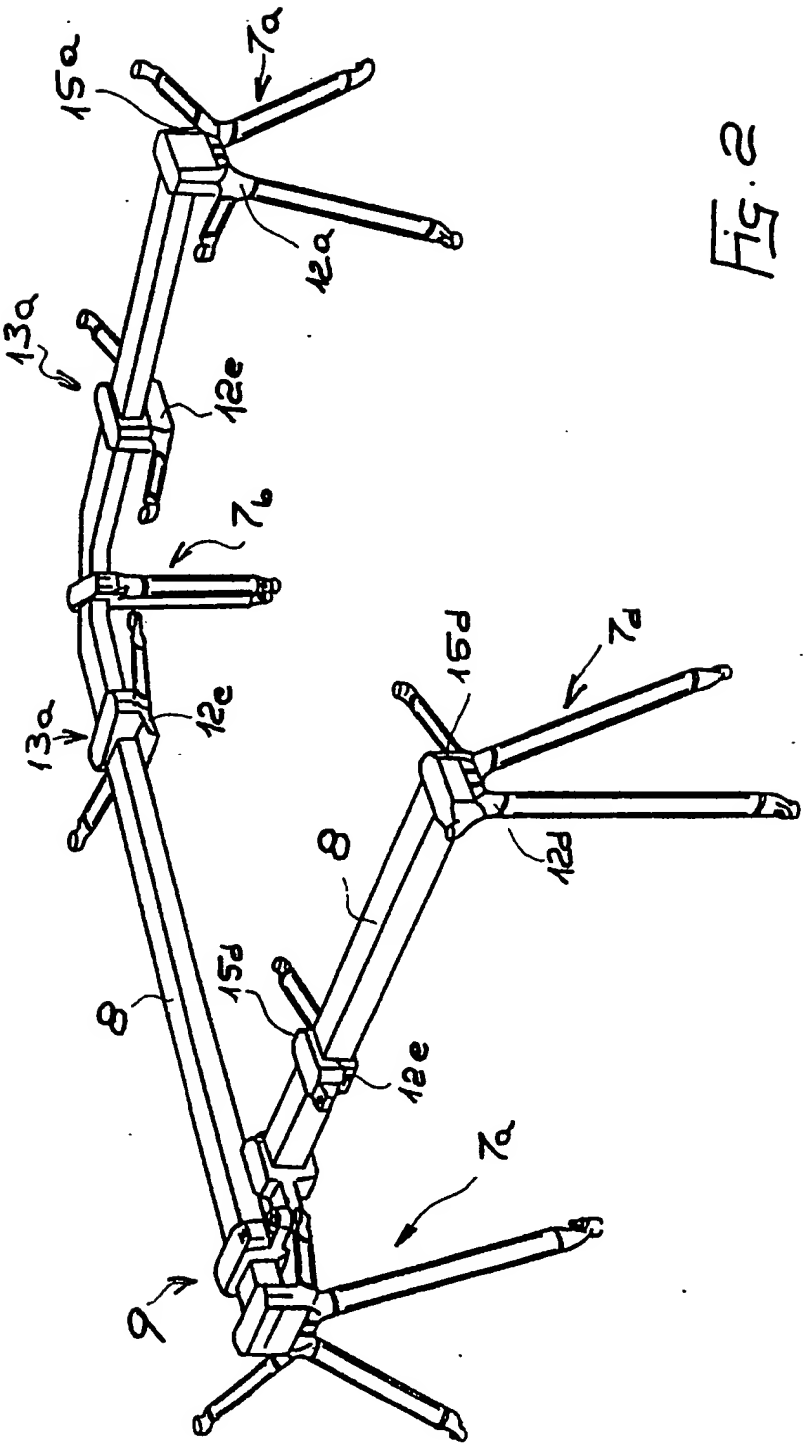

Fig. 2

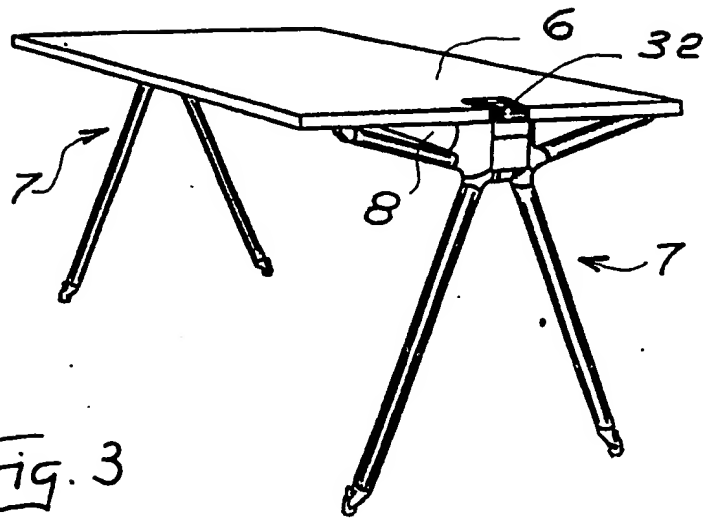

Fig. 3

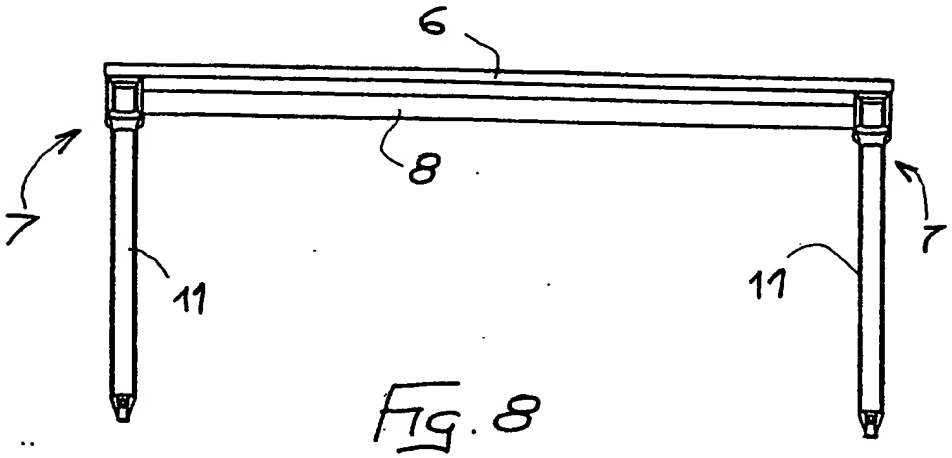

Fig. 8

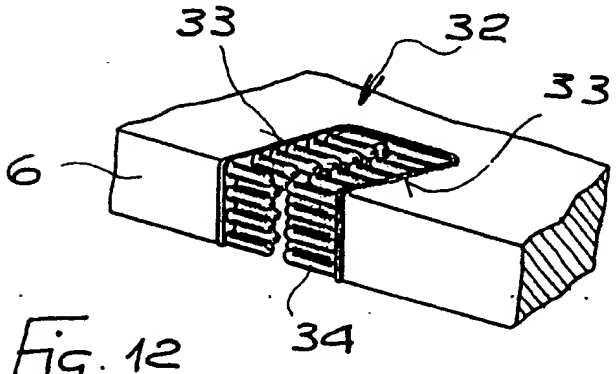

Fig. 12

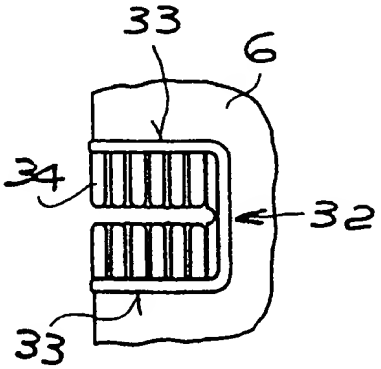

Fig. 13

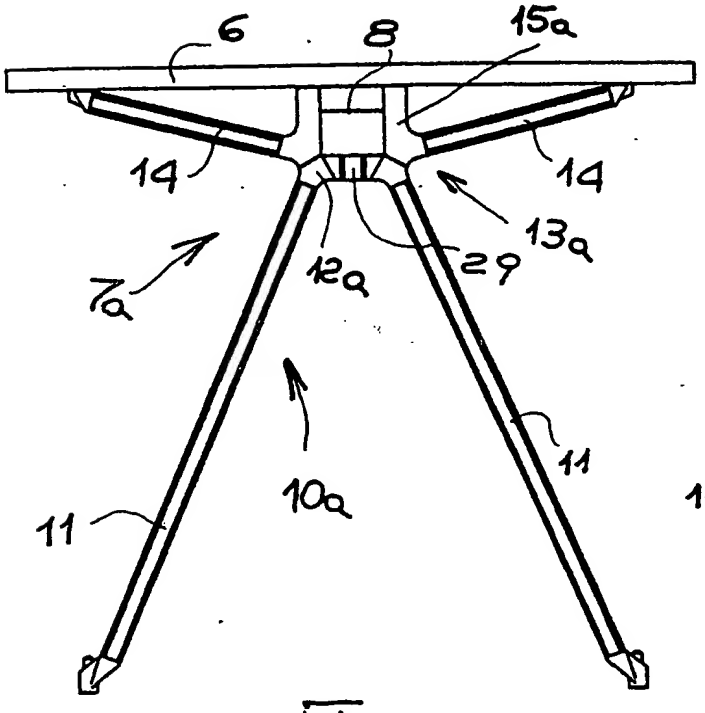

Fig. 4

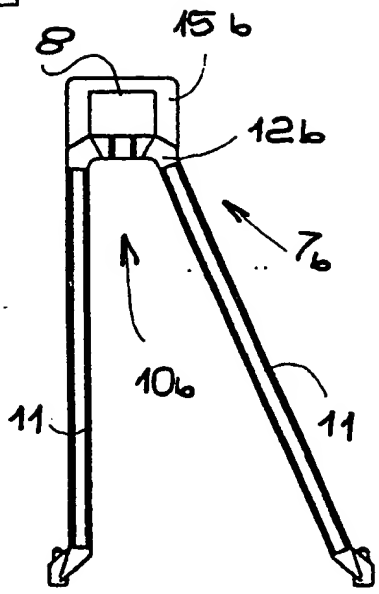

Fig. 5

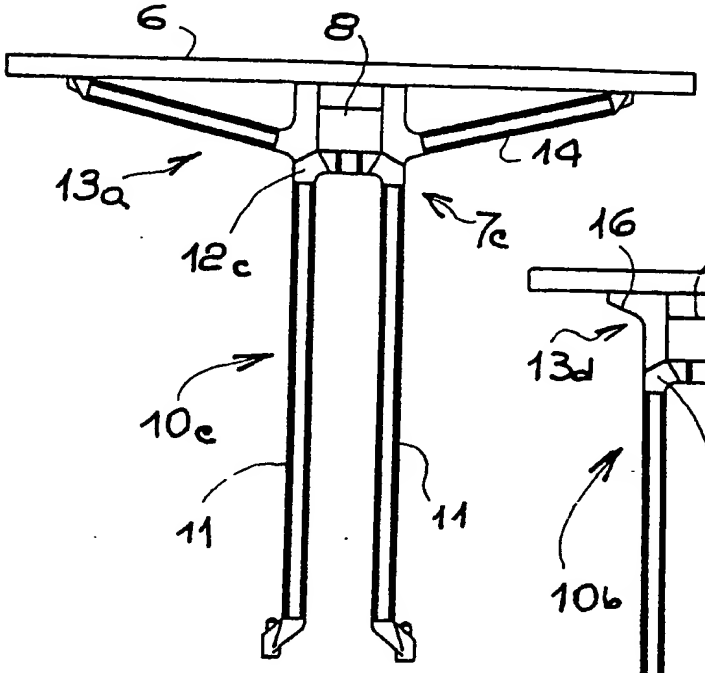

Fig. 6

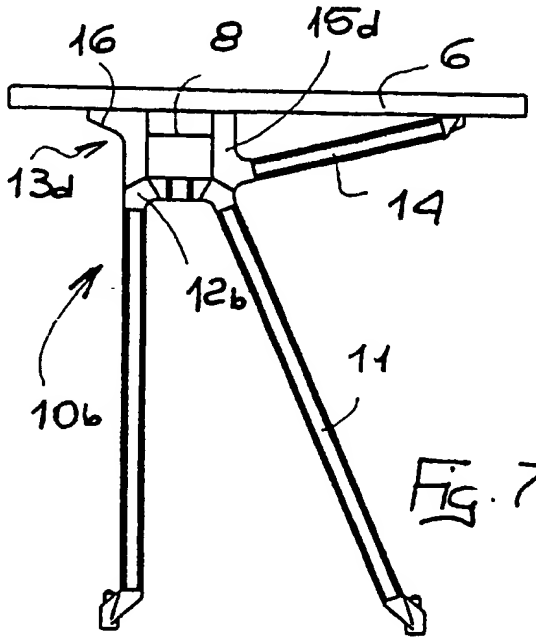

Fig. 7

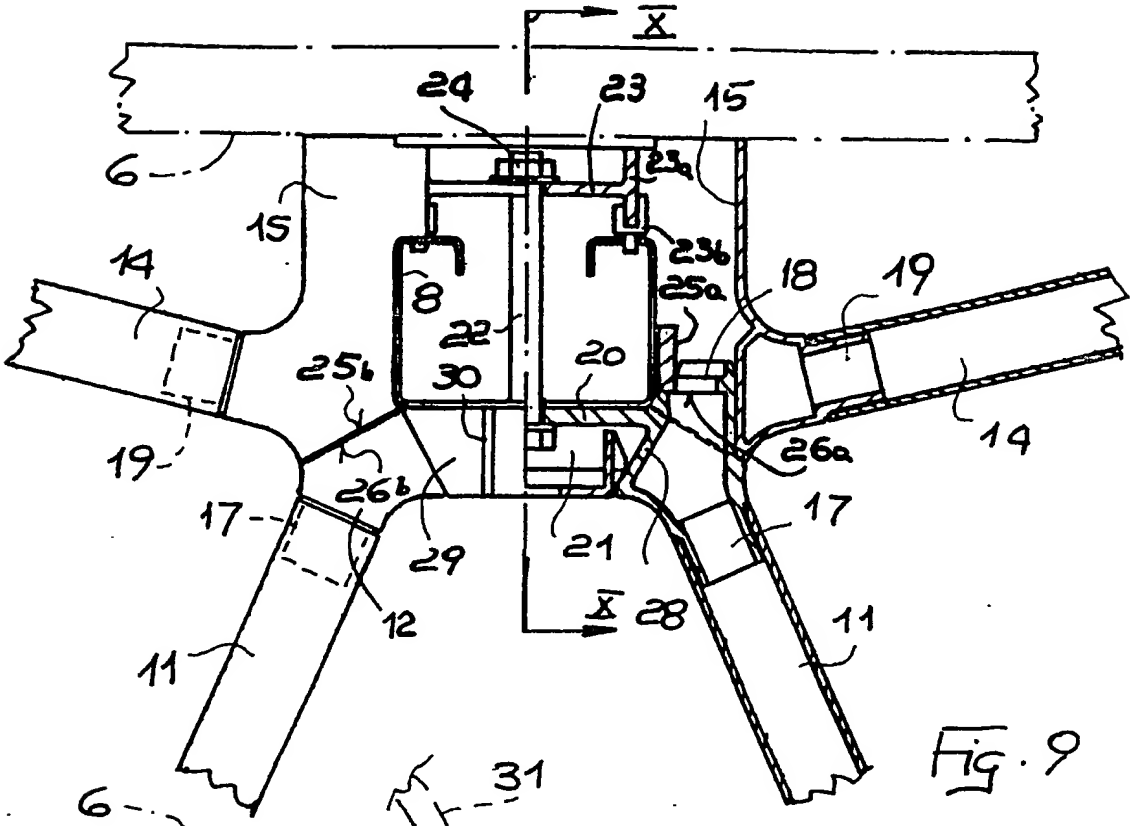

Fig. 9

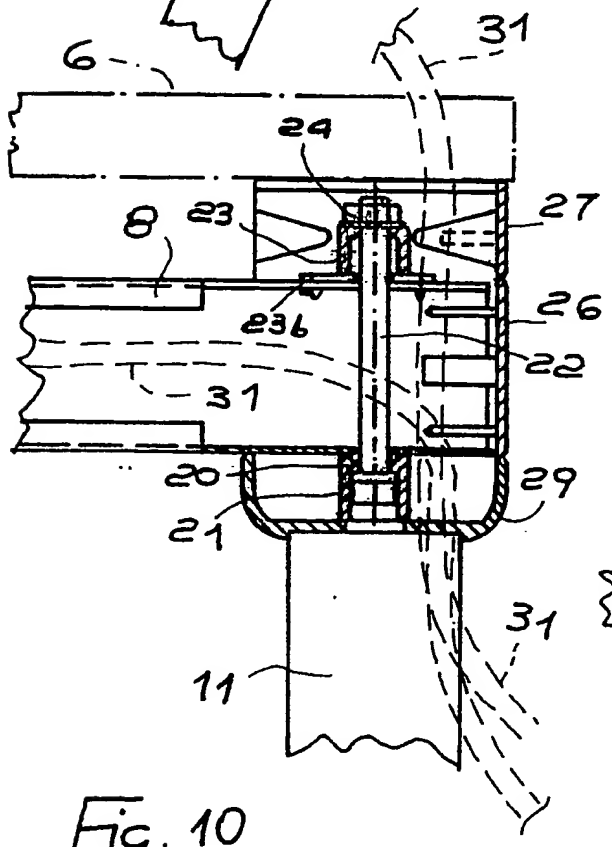

Fig. 10

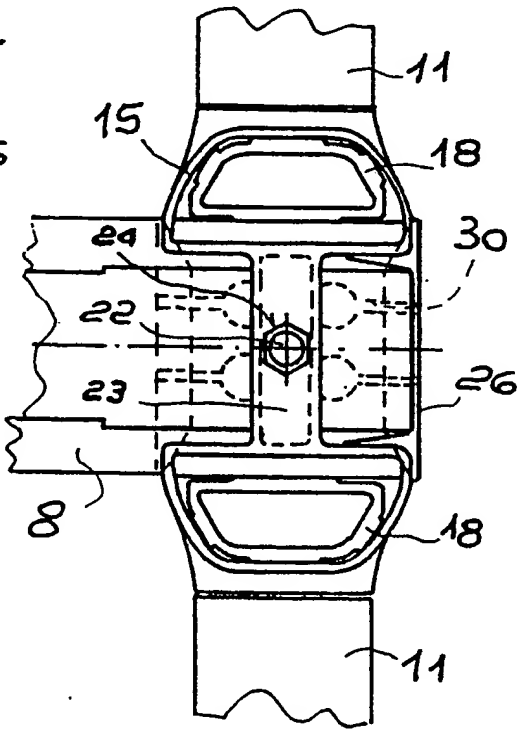

Fig. 11

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 20 1035

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y	FR-A-1373271 (S.S.P.E.S.) * abstract; figure 3 * * page 2, paragraph 3,6 *	1-6	A47B17/00 A47B13/06
Y	EP-A-0108559 (INNOVATIVE METAL) * abstract; figures 10, 11 * * page 11, lines 19 - 24 * * page 20, lines 2 - 9 *	1-6	
A	GB-A-2130877 (KUDOS DESIGNS) * abstract * * page 1, lines 106 - 121 *	1, 7	
A	FR-A-2490941 (H.MILLER A.G.)		
A	US-A-4562986 (FRASCAROLI,BIONDI)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	02 AUGUST 1990	JONES C.T.

CATEGORY OF CITED DOCUMENTS

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